

**Decision Support Systems:
Challenges and
Opportunities**

**Presentation to
McGraw-Hill Inc.**

**by
Jack Keen
INPUT**

June 10, 1985

INPUT



TODAY'S OBJECTIVE

- **Identify Key Application and Market Opportunities that Impact:**
 - **Product Planning**
 - **Acquisition Strategies**
 - **Marketing Support**
 - **Sales Methods**
 - **Internal Productivity**

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AGENDA

- **Research Design**
- **Information Services Directions**
- **Systems Trends**
- **DSS Scope**
- **Markets**
- **Opportunities**
- **Conclusions and Recommendations**

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RESEARCH DESIGN

INPUT



MULTICLIENT STUDY

- **INPUT Prepared Prospectus of Issues**
- **Clients Agreed to Share Costs**
 - **Agence De L'Informatique**
 - **Boeing Computer Services**
 - **Citicorp**
 - **Cognos**
 - **Comshare**
 - **Control Data**
 - **Execucom**
 - **McGraw-Hill**
 - **Micro Data Base Systems**
 - **Pansophic**
 - **Planmetrics**

INPUT



STUDY DESIGN

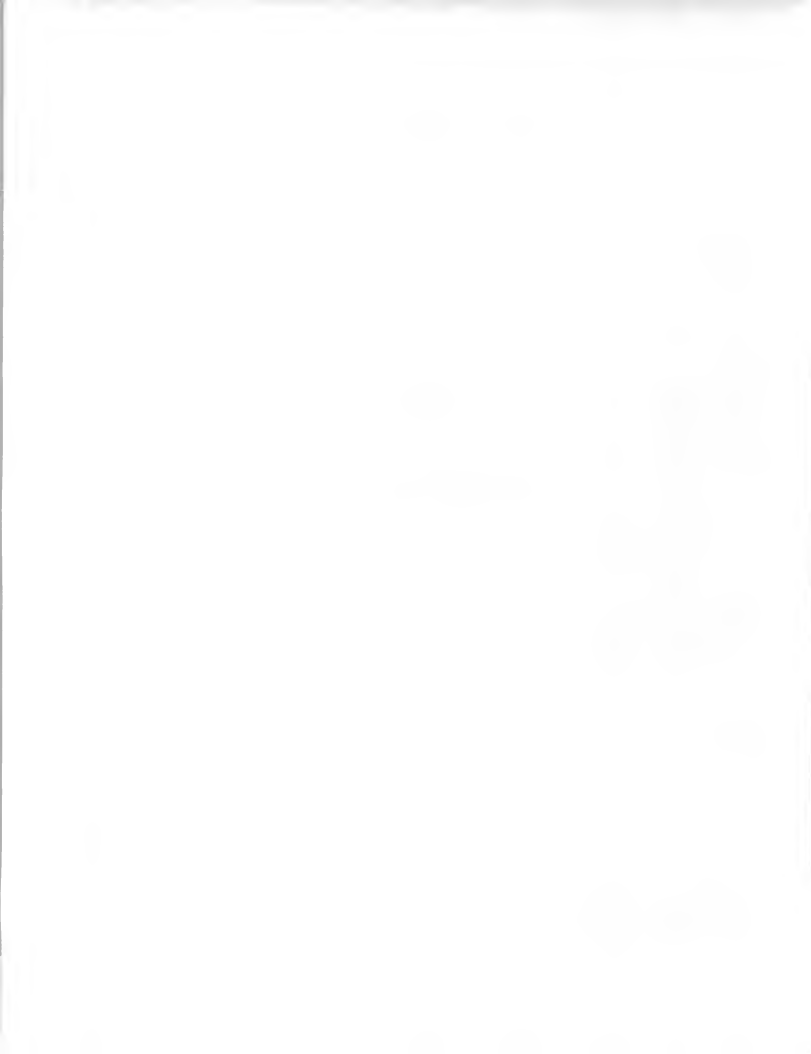
- **Subject Research**
 - **INPUT Data Files**
 - **INPUT Reports**
 - **Industry Experts**
- **Field Research Program**
 - **Vendors**
 - **IS Users**
 - **End-Users**
- **Company Multiples (2-3/Company)**
- **On-Site User Profiles**

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**INFORMATION
SERVICES
DIRECTIONS**

INPUT



Definitions

INFORMATION SERVICES

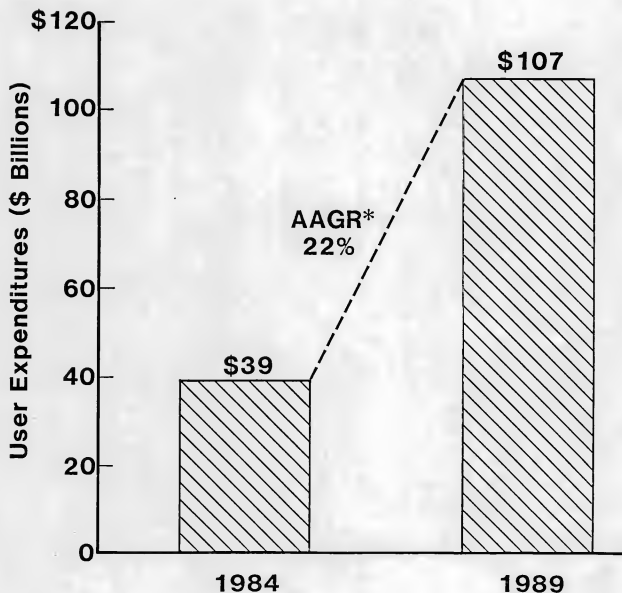
Includes

- **Software Products**
- **Professional Services**
- **Processing Services**
- **Turnkey Systems**

INPUT

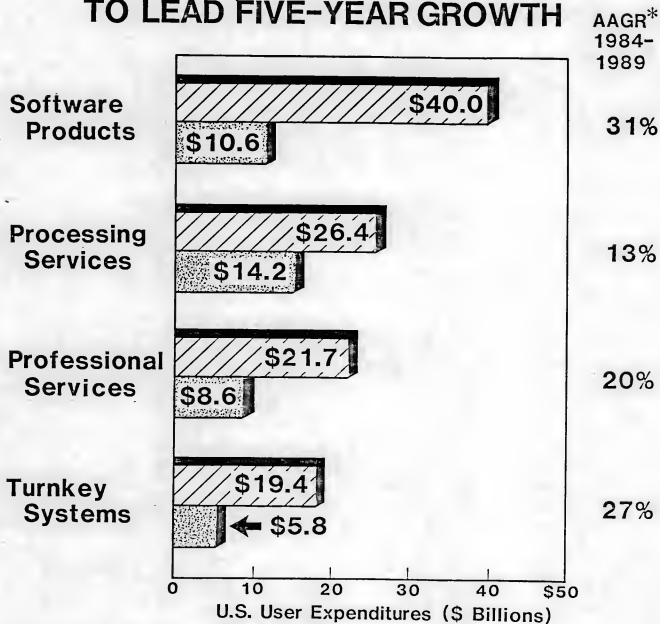


INFORMATION SERVICES: A \$107 BILLION POT OF GOLD



* Average Annual Growth Rate

SOFTWARE PRODUCTS TO LEAD FIVE-YEAR GROWTH

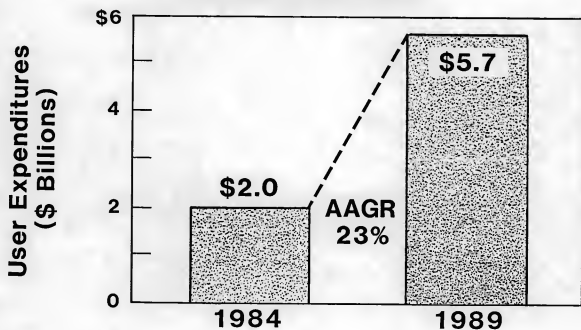


1989		\$107.5	AAGR* 22%
1984		\$39.1	

*Average Annual Growth Rate



ON-LINE DATA BASES ARE ALIVE AND WELL



INPUT



THE GIANTS ARE COMING

Type Vendor	Share of Information Services Market	
	1983	1989
Independents	69%	59%
Computer/ Communications Hardware	10%	16%
Subsidiaries	10%	19%
Other	11%	6%
Total	100%	100%

INPUT



**SYSTEMS TRENDS:
ACCELERATING COMPLEXITY**

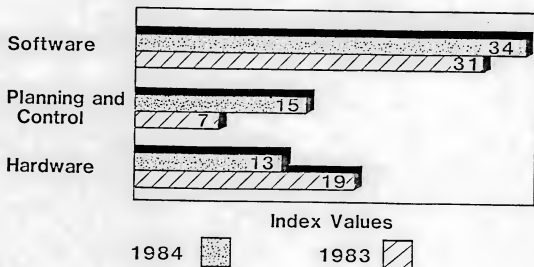
- Information Systems Role

- Systems Evolution

INPUT



SOFTWARE STILL DOMINATES OBJECTIVES



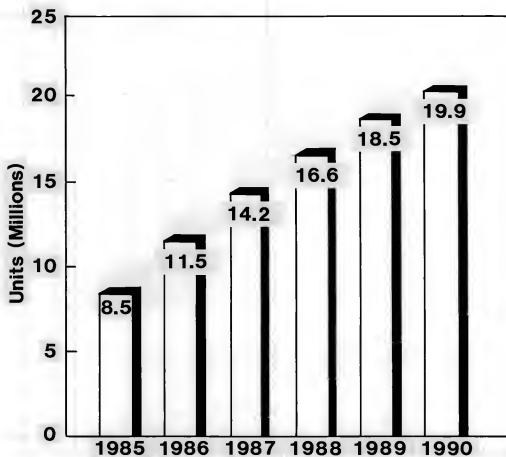
—INPUT—

THE I.S. ATTITUDE (Most Significant Changes Affecting I.S.)

1. End-User Computing	31.7%
2. Software	18.3%
3. Hardware	12.4%
4. Corporate Relationships	8.4%
5. Planning & Control	5.3%

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NET INSTALLED BASE OF MICROCOMPUTERS, 1985-1990

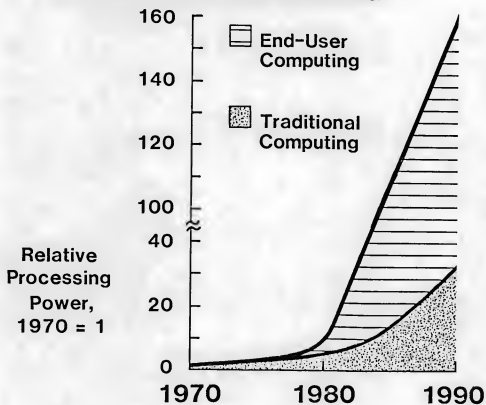


U.S. sales of microcomputers selling for less than
\$15,000 that are used for business

INPUT

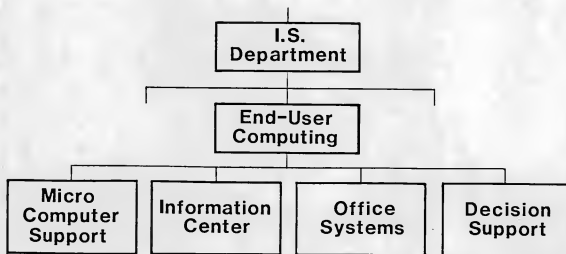


EXPLOSIVE GROWTH IN END-USER COMPUTING



INPUT

ORGANIZATIONAL RESPONSE



I.S. TO EVOLVE TO CONSULTANT ROLE

Future IS Skills

- **Advising**
- **Coaching**
- **Guiding**
- **Facilitating**
- **Teaching**



**Consulting
IS Services**

from

**TECHNICIAN
(1960-1984)**



to

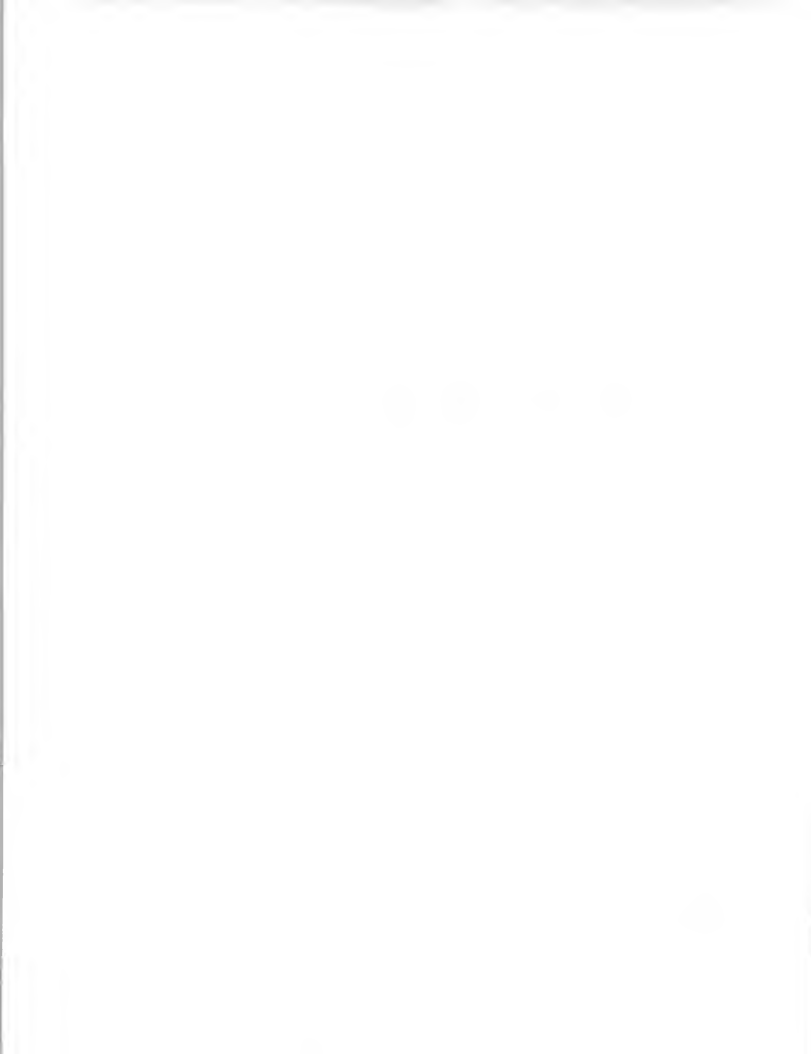
**MARKETERS
(1985+)**

INPUT

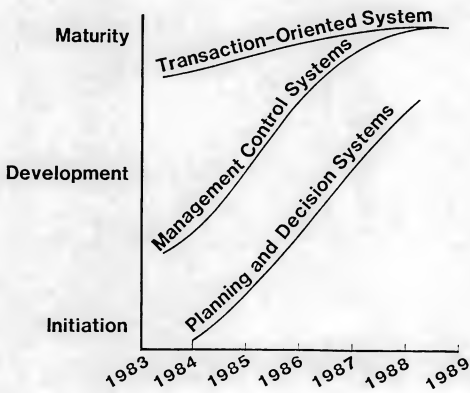


THE SYSTEMS EVOLUTION

INPUT

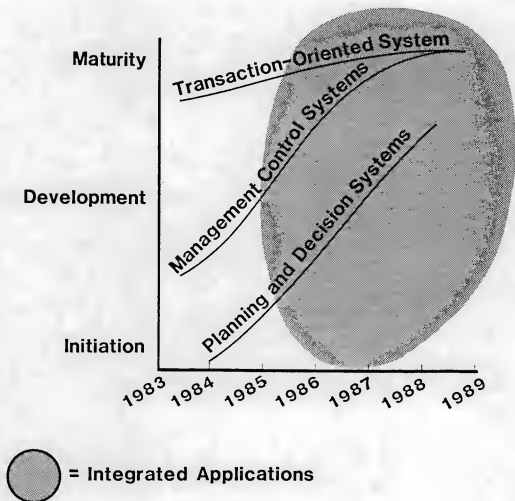


PLANNING SYSTEMS ARE IN THEIR INFANCY



INPUT

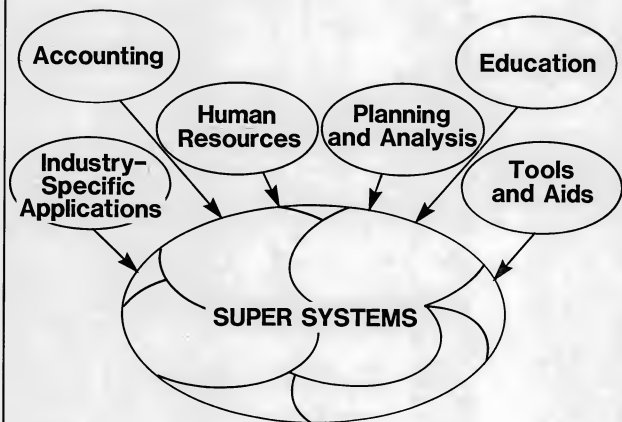
THE OPPORTUNITY = INTEGRATED APPLICATIONS



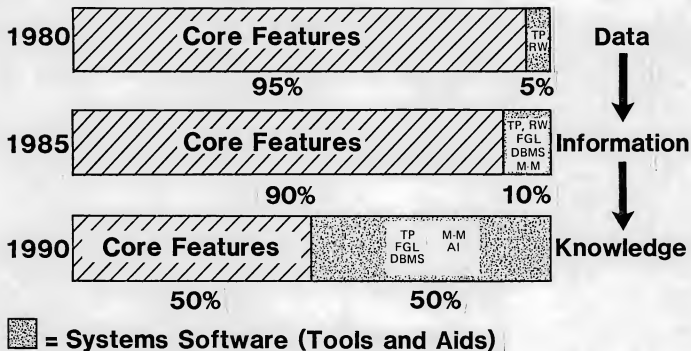
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INCREASING SEGMENT INTEGRATION



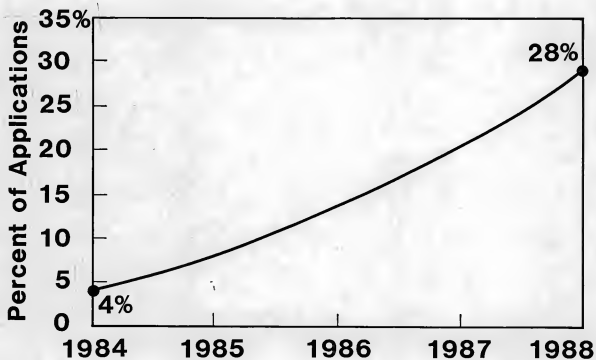
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APPLICATION SOFTWARE COMPONENT EVOLUTION

(TP = Teleprocessing, RW = Report Writing, FGL = Fourth-Generation Language, DBMS = Data Base Management System, M-M = Micro-Mainframe Communication)

Percent = User Perceived Value

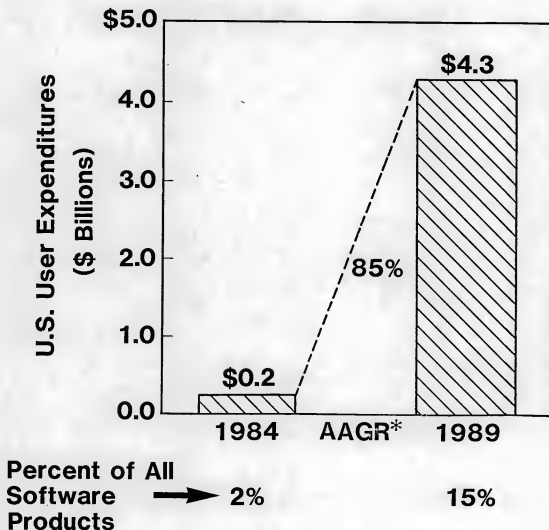
MICRO-MAINFRAME APPLICATIONS GROWTH: 1984-1988



INPUT



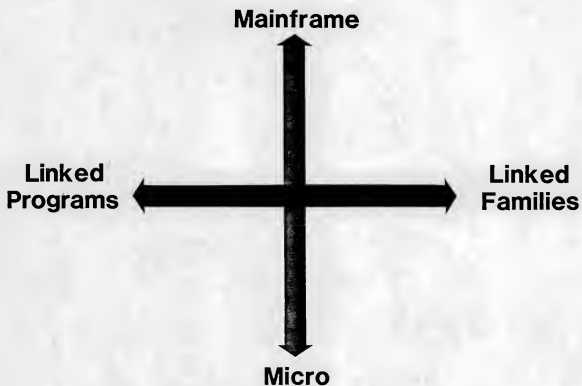
INTEGRATED-DBMS SOFTWARE (Mainframe/Mini)



***Average Annual Growth Rate**

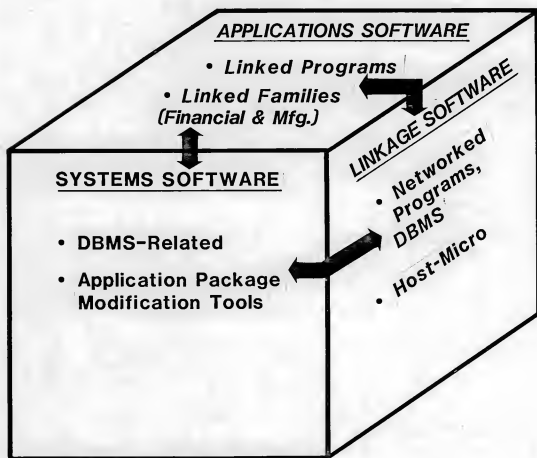
INPUT

FOUR WAY INTEGRATION



INPUT

THE FUTURE IS A THREE-DIMENSIONAL WORLD

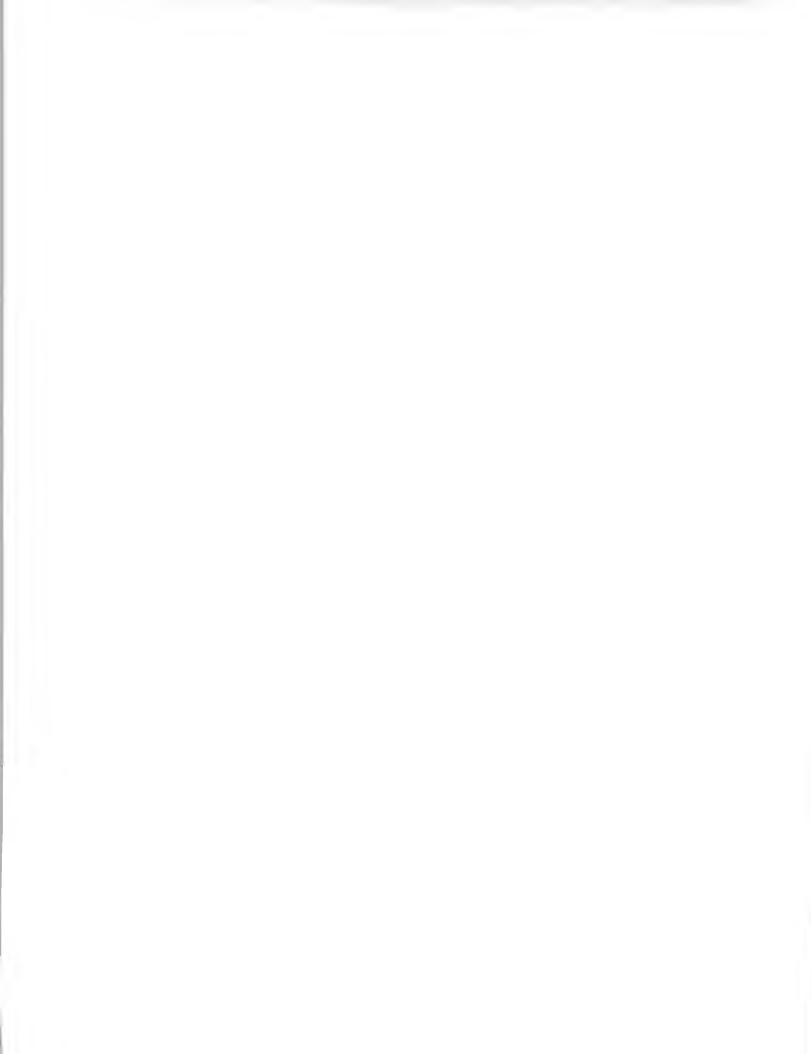


- Vendors Inhabiting a Single Plane will Be at Risk From Those Who Offer a Fuller Range
- Opportunity & Risk: Pressures for Both Integration & Distribution
- Cullinet Success Factor & Springboard



DSS SCOPE

INPUT



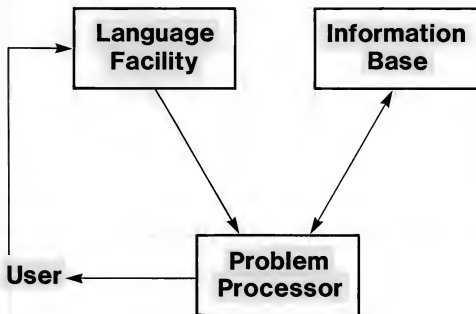
DECISION SUPPORT/DECISION MAKING IN THE ORGANIZATION





DECISION SUPPORT SYSTEMS

Functional Elements



INPUT



GENERAL DSS SYSTEM CHARACTERISTICS

- **Development Initiated by Senior Management**
- **Output Directed at Senior Management**
- **Short System Life Cycle**
- **Limited Modification of System**
- **Used a Limited Number of Times**

INPUT



GENERAL DSS SYSTEM CHARACTERISTICS

- **Packages Provide Only Part of Functional Requirements**
- **High Volume Data Requirements**
- **Based on Most Current Data**
- **Require External Information**

INPUT






DECISION SUPPORT

TOOLS

- Fourth Generation Languages
- Integrated Systems
- Financial Modeling Packages
- Spreadsheets
- Data Base Management Systems (PC Only)
- Graphics Capabilities
- Inquiry Systems
- Statistical Analysis Facilities
- Forecasting Systems
- Operations Research Capabilities
- Economic Data Bases

ARTIFICIAL INTELLIGENCE

- Natural Language Query Systems
 - Expert Systems
 - Knowledge-Based Systems
 - Robotics
 - Vision Systems
 - Voice Recognition/Synthesis
 - Expert-System Generators
 - Specialized Languages (Lisp and Prolog)
 - Fifth Generation Computing
 - AI Machines
- 

**SPECIFIC CHARACTERISTIC
DEPEND ON . . .**

- **Type of Decision Support System**
- **Stage of User Development/
Maturity**
- **User/Vendor Perspective**

INPUT



TYPES OF DSS

- **Planning and Analysis Systems**
- **Operational Production Systems**

INPUT



DSS MATURITY BY BUSINESS CLASS

DSS MATURITY STAGES	1984 BUSINESS CLASSES		
	I	II	III
I (Early)	60	70	80
II (Maturing)	25	20	15
III (Fully Mature)	15	10	5

PERCENT OF COMPANIES IN EACH CATEGORY

DSS MATURITY STAGES	1989 BUSINESS CLASSES		
	I	II	III
I (Early)	10	30	40
II (Maturing)	30	30	40
III (Fully Mature)	60	40	20

INPUT



STAGE 1 - EARLY DSS ENVIRONMENT CHARACTERISTICS

- **Functional System Characteristics**
 - **Modeling in RCS Environment**
 - **Limited Financial DSS Applications**
 - **DSS Applications Standalone**
 - **Financial Analyst Main User**
 - **Data Entered Manually**
 - **Unfocused Use of Personal Computers**
 - **One or Two Decision Support Products**
 - **Basic Reporting Requirements**

INPUT



STAGE I - EARLY DSS ENVIRONMENT CHARACTERISTICS

- **Other Issues**
 - **DSS Expenditures Easily Segregated**
 - **No Information Center**
 - **Still Developing Baseline Applications Systems (Non-DSS)**
 - **Users "Computer Literate"**
 - **Little IS Recognition of DSS**

INPUT



STAGE II - MATURING DSS ENVIRONMENT CHARACTERISTICS

- **Functional System Characteristics**
 - **RCS DSS Applications Migration In-House**
 - **Broad Base of Financial DSS Applications**
 - **DSS Applications with Basic Links**
 - **Corporate Planning Main User**
 - **Some Automatic Data Transfer from Production Systems**
 - **Growing Base of Personal Computers Communicating with Mainframe**
 - **Wide Variety of DSS Products**
 - **Enhanced Reporting/Graphics Capabilities Required**

INPUT



STAGE II - MATURING DSS ENVIRONMENT CHARACTERISTICS

- **Other Issues**

- **DSS Expenditures Less Apparent**
- **Early Stage IC Established**
- **Early Systems Data Base
Environment Established**
- **Less Sophisticated Computer Users**
- **IS Rivalry with End-User Computing**

INPUT



STAGE III - FULLY MATURE DSS ENVIRONMENT CHARACTERISTICS

- **Functional System Characteristics**
 - **RCS Mainly Utilized for Informational Data Bases**
 - **Broad Base of DSS Applications - Many Areas**
 - **DSS Applications Fully Interfaced**
 - **Users Throughout Organization**
 - **Production Data Base Updates Routinely Provided**
 - **Large Number of Personal Computers Linked to Mainframe**
 - **"Gateway" Interface to DSS Products**
 - **Sophisticated Reporting/Graphics Capabilities**

INPUT



STAGE III - FULLY MATURE DSS ENVIRONMENT CHARACTERISTICS

- **Other Issues**

- **Great Difficulty in Determining DSS Expenditures**
- **Information Center Actively Used**
- **Have Integrated Data Base Application System Environment**
- **Increasing Computer Literacy Required**
- **IS Active Participant in DSS Developments**

INPUT



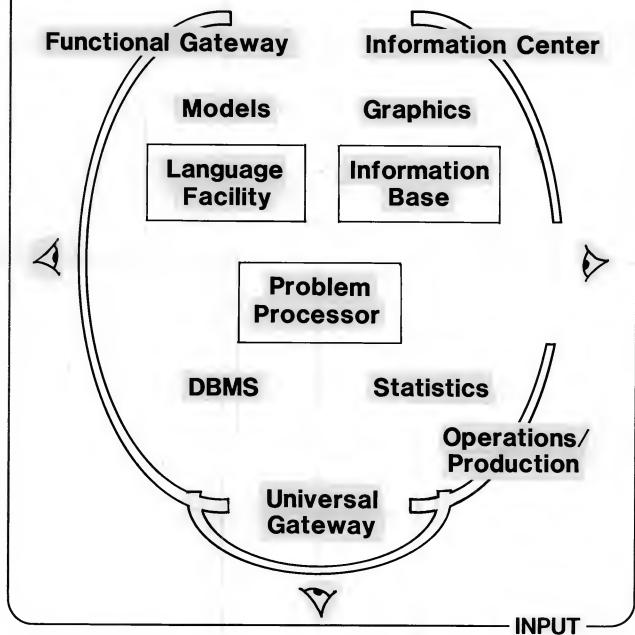
STAGE III - FULLY MATURE DSS ENVIRONMENT CHARACTERISTICS

- **Unique Stage Characteristics**
 - **Systems Prototyping Common Practice**
 - **IC May Be on Dedicated Mainframe**
 - **Experimenting with Artificial Intelligence Applications**

INPUT

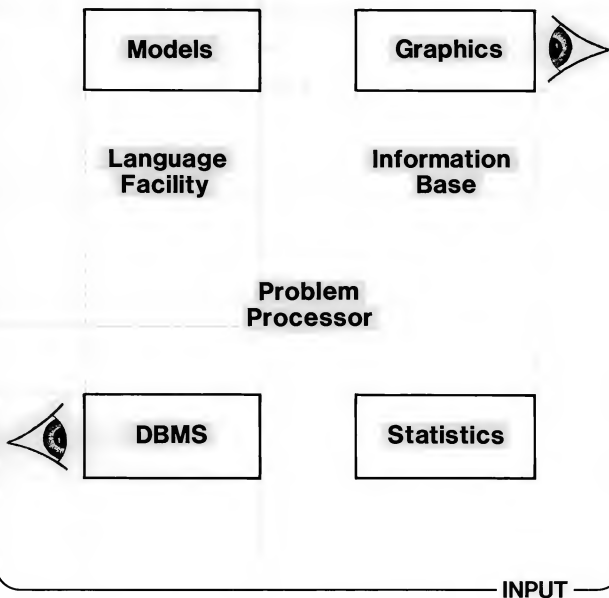


USERS' VIEWS OF DSS





VENDORS' VIEWS OF DSS





TOP TEN DSS FUNCTIONS AND ACTIVITIES

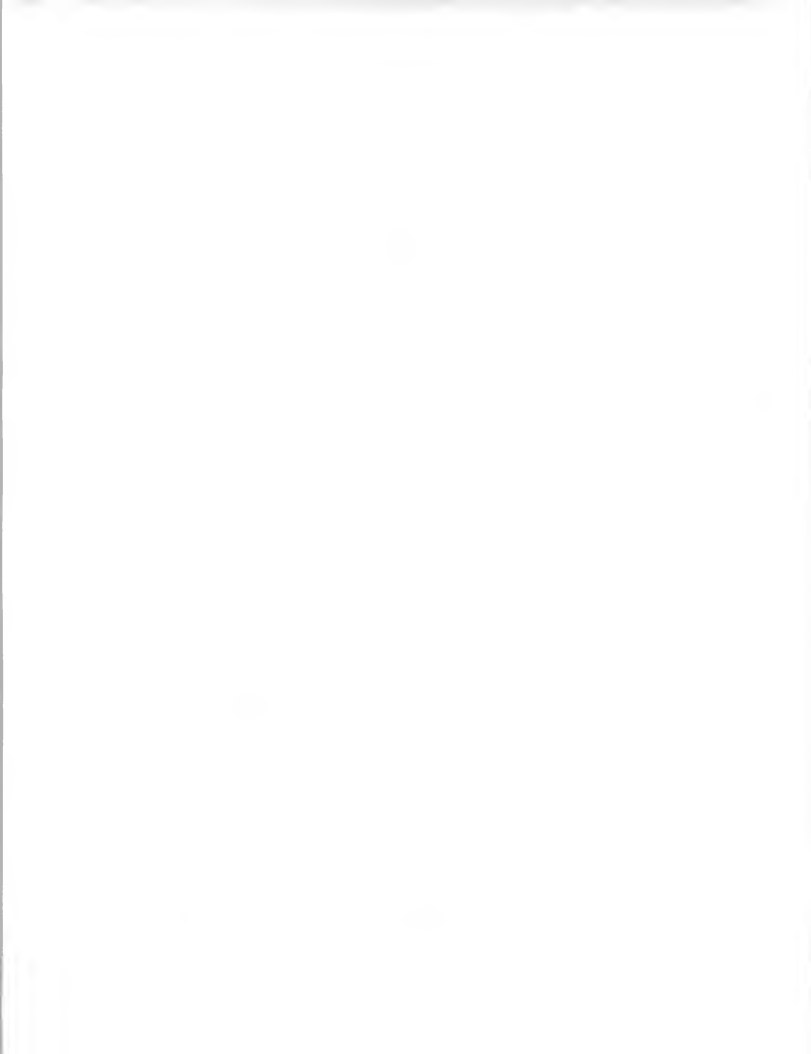
- 1. Data Acquisition**
- 2. Data Base Management**
- 3. Forecasting Capability**
- 4. Modeling Language**
- 5. Spreadsheet**
- 6. Report Generation**
- 7. Graphics**
- 8. Financial Functions**
- 9. Statistical Functions**
- 10. Telecommunications**

INPUT

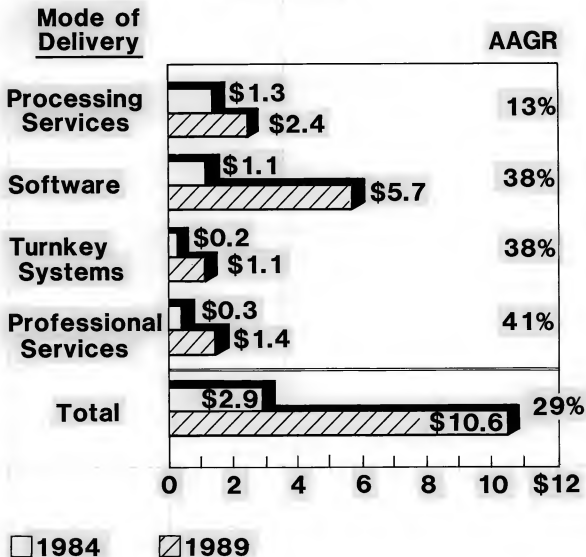


MARKETS

INPUT



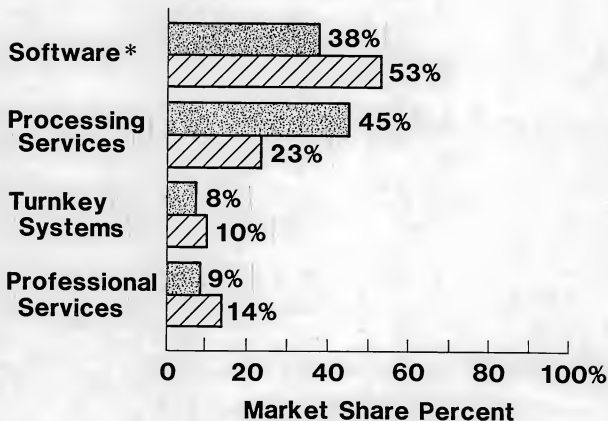
DECISION SUPPORT EXPENDITURES (\$ Billions)



INPUT



DSS MARKET SHARE BY MODE OF DELIVERY



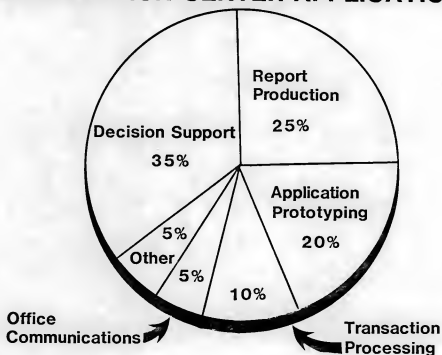
■ 1984

▨ 1989

* 1984 - Mainframe 17%, Micro 21%

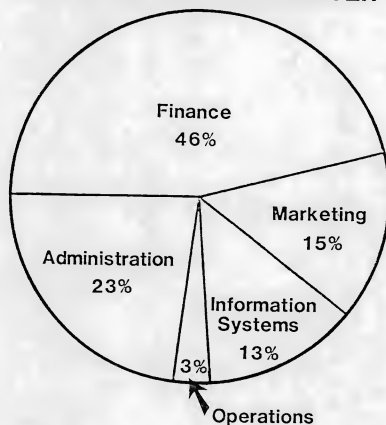
1989 = Mainframe 21%, Micro 32%

DECISION SUPPORT LEADS INFORMATION CENTER APPLICATIONS



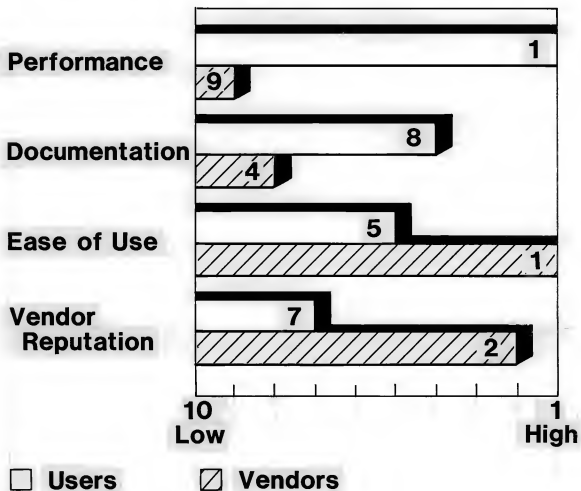
INPUT

DEPARTMENTS USING THE INFORMATION CENTER



INPUT

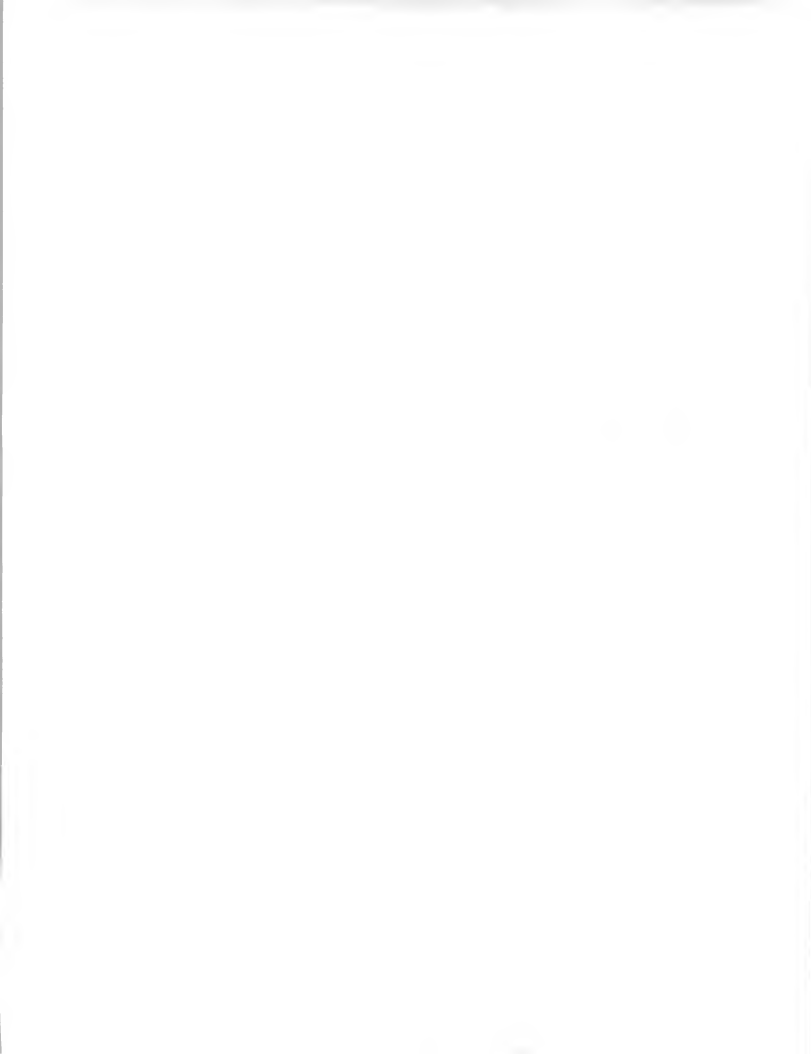
**VENDORS ARE MISPERCEIVING
SOME USER DECISION CRITERIA
(Mainframe/Mini Software Products)**



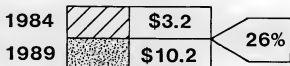
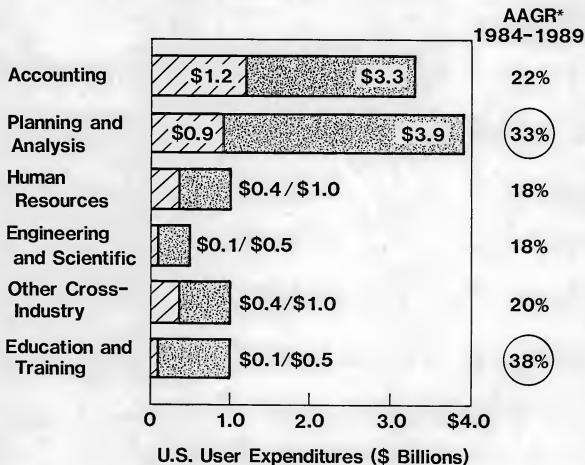
INPUT

OPPORTUNITIES

INPUT



CROSS-INDUSTRY APPLICATIONS SOFTWARE MARKET, 1984-1989

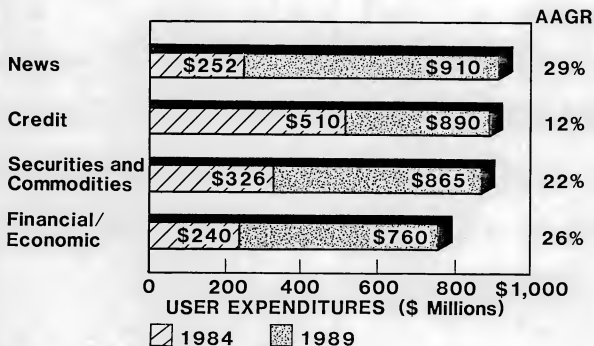


○ = Fastest Growing Markets

*Average Annual Growth Rate

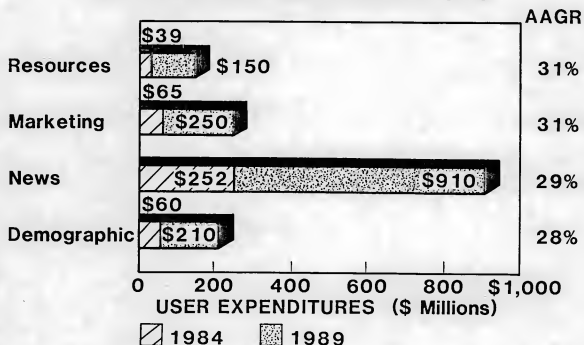
INPUT

LARGEST ON-LINE DATA BASE SECTORS



INPUT

FASTEST GROWING ON-LINE DATA BASE SECTORS



INPUT

DSS MATURITY STAGE REQUIREMENTS

	Stage I	Stage II	Stage III
Integrated Requirements	Standalone		
Differentiated Requirements		Linked	
Interfaced Requirements			Full Interfacing

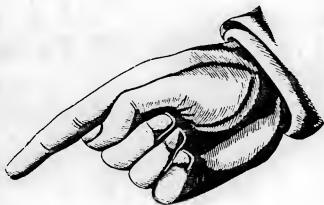
INPUT



DSS OPPORTUNITIES BY STAGE AND TYPE OF PRODUCT/SERVICE

	Stage I	Stage II	Stage III
Software	Standalone	Linked	Full Interfacing
Remote Computing Services		Linked	
Turnkey Systems		Linked	Full Interfacing
Professional Services	Standalone	Linked	

INPUT



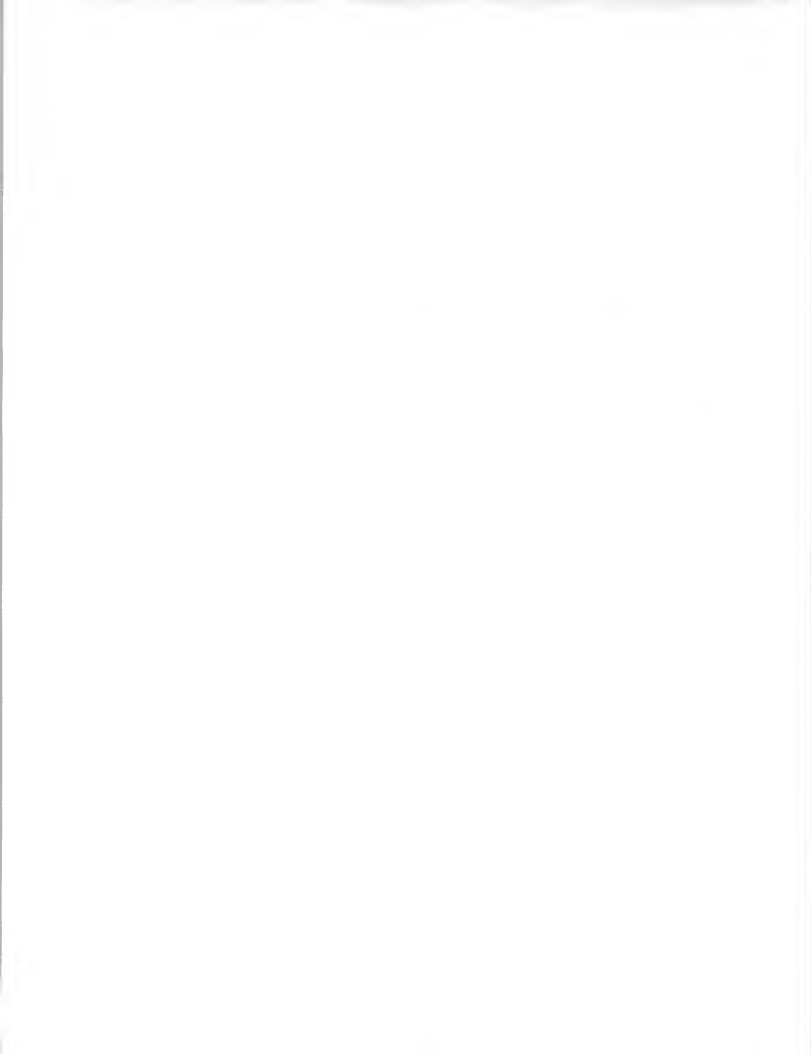
CONCLUSIONS AND RECOMMENDATIONS

INPUT

CONCLUSIONS

- **Markets Are Healthy**
- **Competition Will Be Larger, Stronger**
- **Systems Will Have Four-Way Integration**
- **Systems Software To Become Integral Part of Applications Software**
- **IS Department to Become a Distribution Channel**

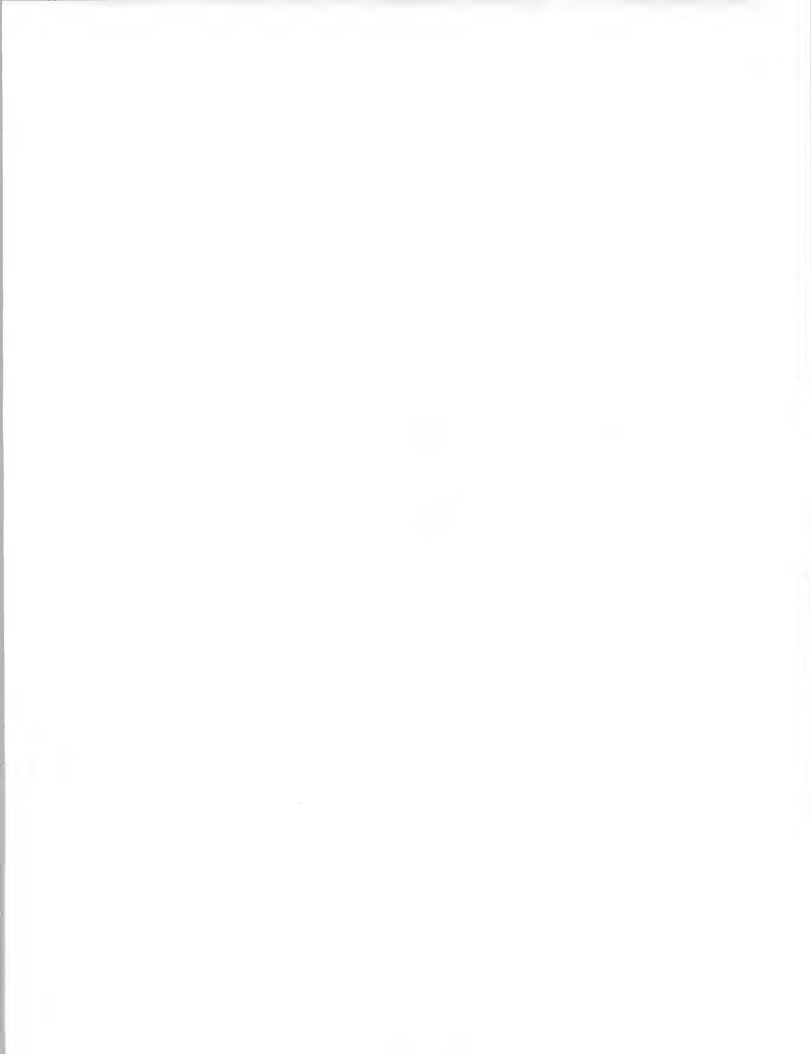
INPUT



EMPHASIZE "HIGH APPEAL" DSS COMPONENTS

- **Better Data Acquisition**
- **Fresher Information**
- **Improved Integration with Other Systems**
 - **Horizontal Links**
 - **Micro-Mainframe Links**
- **Enhanced What-If**
- **Expanded Problem Definition Support**

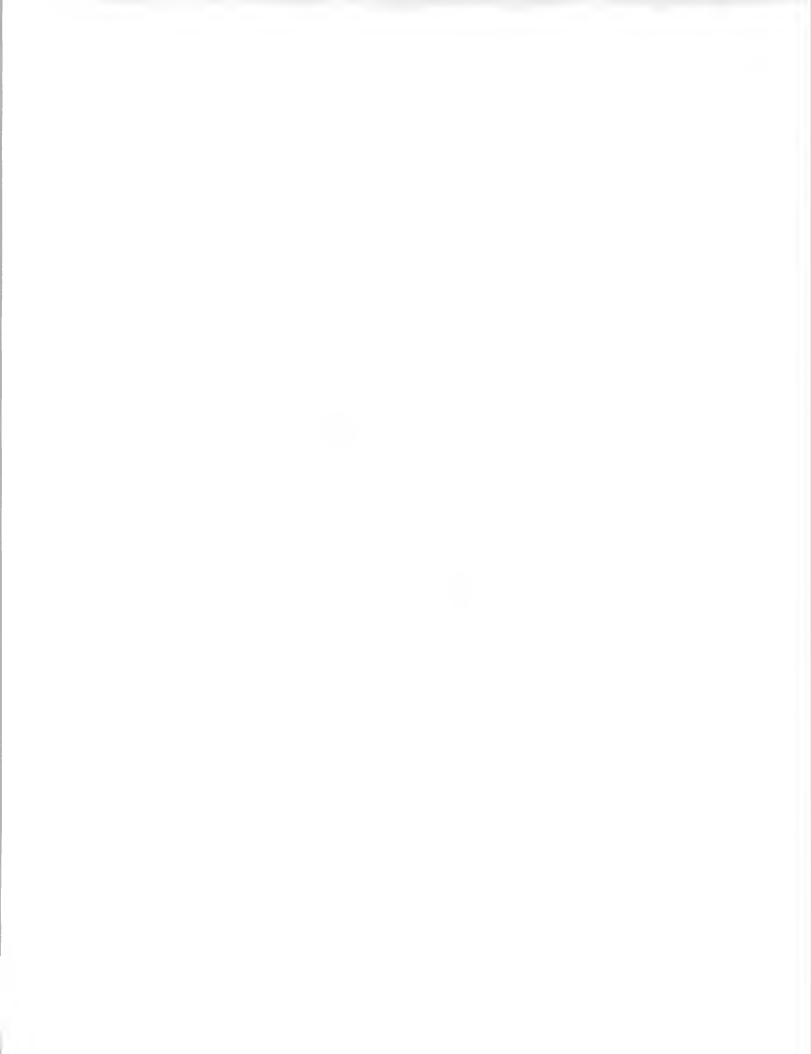
INPUT



**DECISION SUPPORT “SYSTEMS”
NEED DECISION SUPPORT “PEOPLE”**

- **Technology Ahead of People**
- **DSS - Evolution, Not Revolution**
 - **Addresses Personal Activities**
 - **Changes Our Work Methods**
- **Users Find Concepts Elusive**

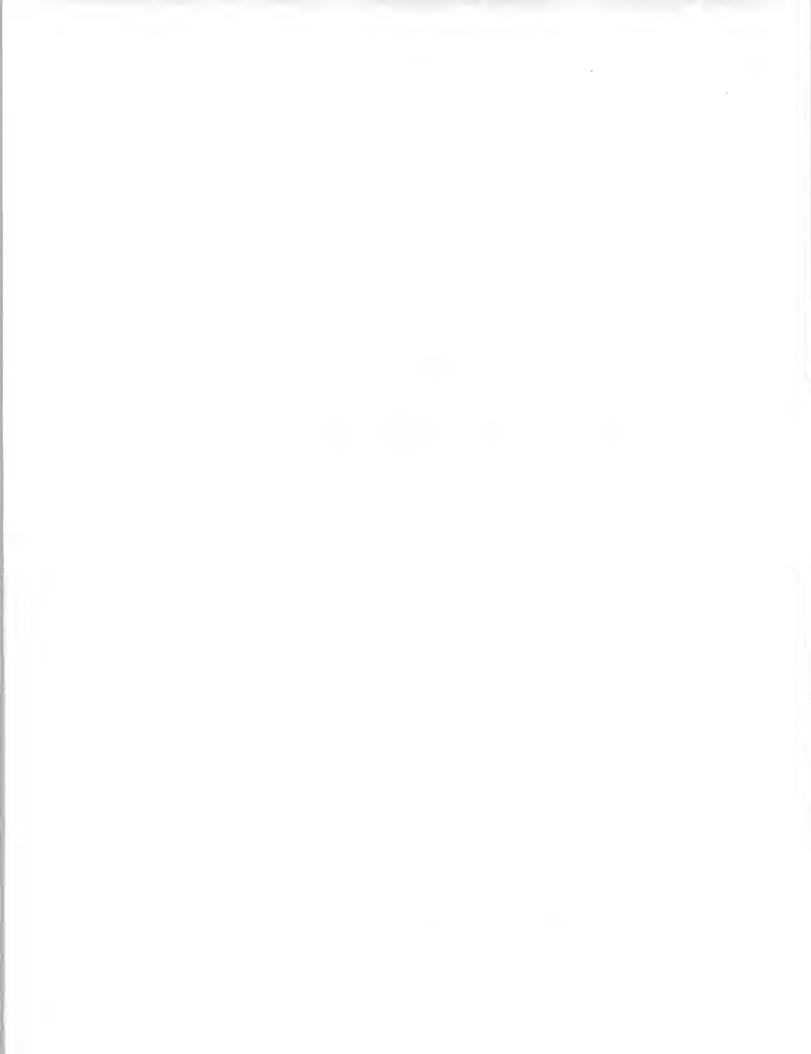
INPUT



KEYS TO SUCCESS

- **Explicitly Define Segment Targets**
 - **Cross Industry**
 - **Industry Specific**
- **Emphasize “High Appeal” DSS Components**
- **Make “Knowledge” the Real Product**
- **Provide Information-Heavy Value-Added**
- **Adopt a Product-Wide Systems Strategy**
- **Re-Tune Sales Tools, Training**
- **Accelerate Partnering**
- **Remember the User**

INPUT



EMPHASIZE "HIGH APPEAL" DSS COMPONENTS

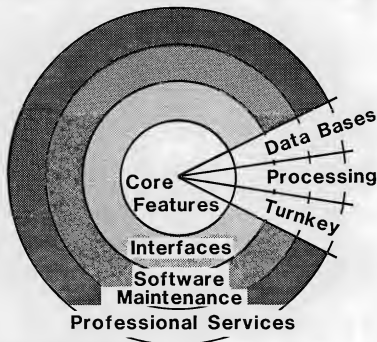
- **Reduced Learning Time**
- **Better Performance**
- **Micro Versions of Mainframe Products**

INPUT



KEYS TO SUCCESS

- Make “Knowledge” the Real Product



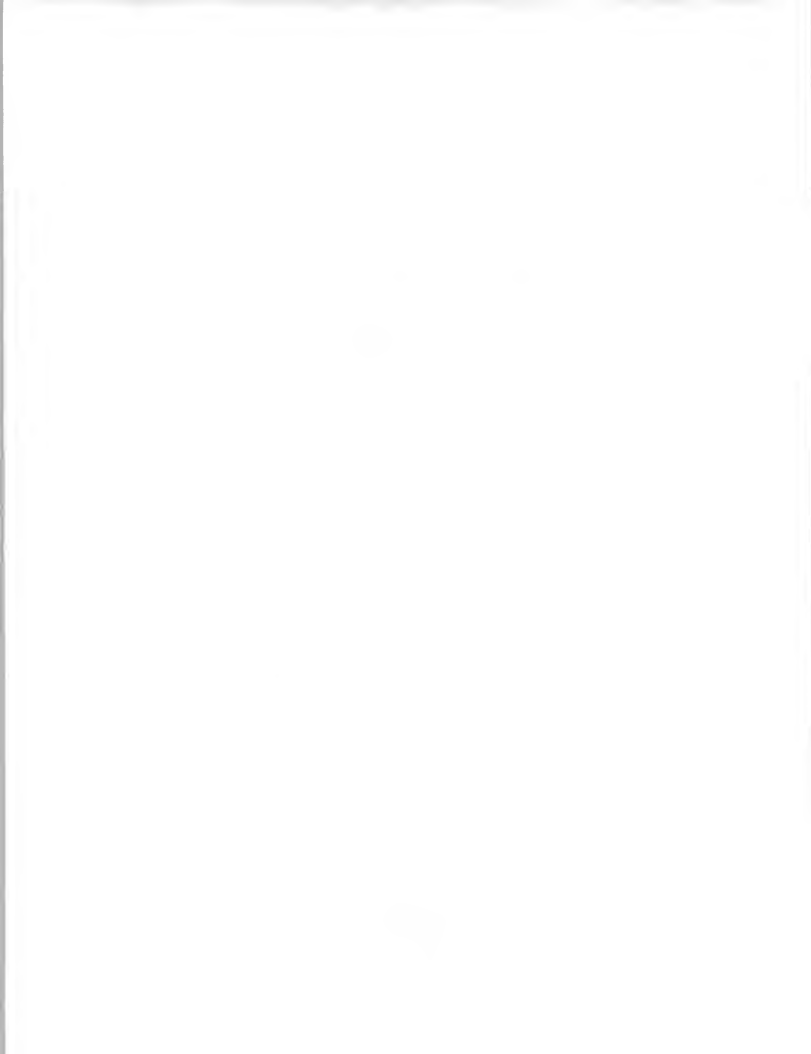
- Using Multiple . . .
 - Interfaces
 - Support Services
 - Delivery Modes

INPUT

PROVIDE INFORMATION-HEAVY VALUE-ADDED

- **Offer New Types of Information Integration**
- **Improve Ties to Transaction Systems**
- **Provide Easier-To-Access Delivery Modes**

INPUT



HAVE A LONG-TERM PRODUCT-WIDE SYSTEMS STRATEGY

- **Overlapping Market Segments**
- **Systems Compatibility**
 - **Command and File Software/Hardware**
- **Development Standards**
- **Payoffs**
 - **Increases Product Appeal**
 - **Builds Barriers to Competition**
 - **Lowers Marketing Costs**
 - **Leverages Technical Resources**

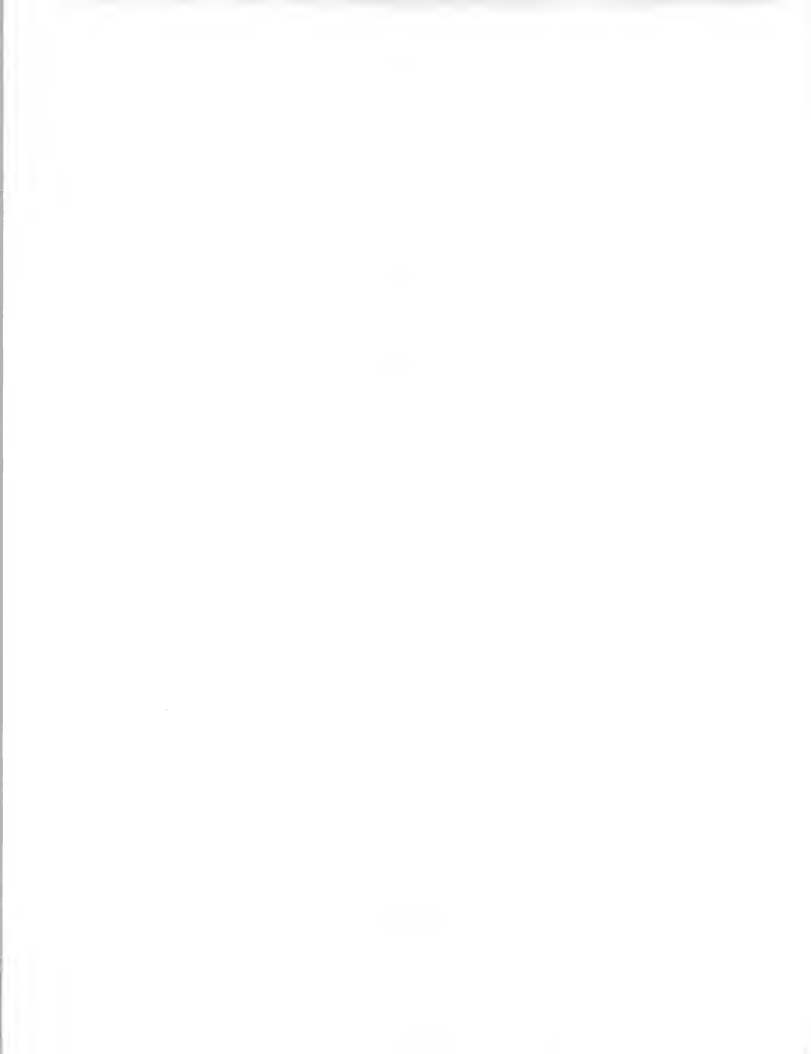
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RE-TUNE SALES TOOLS, TRAINING

- **Match Tools to Priority Segments**
- **Emphasize . . .**
 - **Heavy Application-Orientation**
 - **Payoffs from Improved Decision-Making**
 - **Compatibility**

INPUT



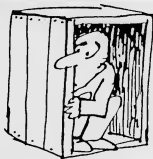
ACCELERATE PENETRATION VIA PARTNERING

- **Software**
- **Distribution**
- **Support**

INPUT



REMEMBER THE USER



FRAGILE! HANDLE WITH CARE

- **Shield from Complexity**
- **Recognize Psychological Impacts**
- **Be Realistic Regards Rate of Acceptance**

INPUT

CONCLUSIONS:

- **Abundant Opportunity**
- **Bring Money**
- **Bring Management**

INPUT

INPUT

- **Information Services Specialist**
- **10 Years in Business**
- **65 Person Staff**
- **Offices Worldwide**
- **Market Research Focus**
- **Personal Interview Based**

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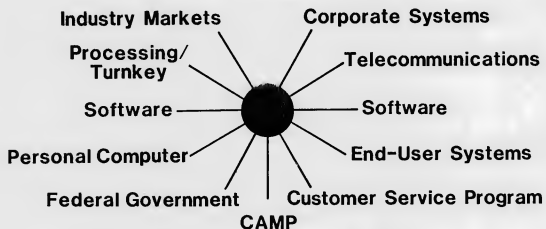
For
L M
Need fails
only - no
hard copy

INPUT RESEARCH SOURCES

- **Subscription Programs**
- **Multiclient Projects**
- **Custom Consulting**

INPUT

INPUT SUBSCRIPTION PROGRAMS



INPUT

GET YOUR RIGHTFUL SHARE!



**\$11 BILLION
DSS**

INPUT

